

## Part 8 TRAFFIC CONTROL FOR RAILROAD AND LRT GRADE CROSSINGS

June 15, 2011

- New FHWA MUTCD published in Dec 2009
- 23 CFR 655.603
  - The MUTCD is the national standard
  - States having their own MUTCD's or Supplements shall revise them to be in "substantial conformance" to the new FHWA MUTCD within 2 years (by Jan 15, 2012)
- DE MUTCD:
  - Draft version Posted to DE Register April 2011
  - Publication Target: **July 2011**

- Paragraphs are numbered
- *Guidance is italicized*
- No more metric
- Definitions relocated to Part 1

## Section 8A.08 Temporary Traffic Control Zones

### Support:

01 Temporary traffic control planning provides for continuity of operations (pedestrians and bicycles, transit operations, and access to property/utilities) at a grade crossing is suspended because of temporary traffic control operations.

### Standard:

02 **Traffic controls for temporary traffic control zones that include grade crossings are specified in Part 6.**

03 **When a grade crossing exists either within or in the vicinity of a temporary traffic control zone, lane restrictions, flagging (see Chapter 6E), or other operations shall not be used that would cause highway vehicles to stop on the railroad or LRT tracks. A law enforcement officer is provided at the grade crossing to minimize the potential for stopping on the tracks, even if automatic warning devices are in place.**

### Guidance:

04 *Public and private agencies, including emergency services, businesses, and other agencies, should meet to plan appropriate traffic detours and the necessary signing, flagging, and operations during temporary traffic control zone activities. Consideration should be given to the type of grade crossing to be closed, the type of rail or LRT and highway crossing, the materials and techniques of repair.*

- **Standards remain bold**
- Options and support remain unformatted

### Standard:

01 When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be defined as follows:

- A. **Standard**—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All Standard statements are labeled, and the text appears in bold type. The verb “shall” is typically used. The verbs “should” and “may” are not used in Standard statements. Standard statements are sometimes modified by Options. Standard statements shall not be modified or compromised based on engineering judgment or engineering study.
- B. **Guidance**—a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. All Guidance statements are labeled, and the text appears in unbold type. The verb “should” is typically used. The verbs “shall” and “may” are not used in Guidance statements. Guidance statements are sometimes modified by Options.
- C. **Option**—a statement of practice that is a permissive condition and carries no requirement or recommendation. Option statements sometime contain allowable modifications to a Standard or Guidance statement. All Option statements are labeled, and the text appears in unbold type. The verb “may” is typically used. The verbs “shall” and “should” are not used in Option statements.
- D. **Support**—an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements are labeled, and the text appears in unbold type. The verbs “shall,” “should,” and “may” are not used in Support statements.

- **Standards are requirements that SHALL be followed unless there is an Option**
- *Guidance is recommended and SHOULD be followed*
- Options MAY be followed and are sometimes modifications to Standards and Guidance

- **Most Delaware Revisions were introduced in previous versions of the DE MUTCD and will be retained.**

Today's training will focus more on the new changes from the Federal MUTCD

- **Old Parts 8 (RR) and 10 (LRT) are now combined**

- Reduces redundancy and cross-references
- Sections renumbered to include Part 10 (LRT)

Since we have no LRT in DE, will not discuss as part of today's training

- **New chapter 8D added for Pathway Grade Crossings**
- **"Grade crossing" is a new generic term**

## PART 8 – TRAFFIC CONTROL FOR RAILROAD AND LIGHT RAIL TRANSIT GRADE CROSSINGS

- 8A: General
- 8B: Signs and Markings
- 8C: Flashing-Light Signals, Gates, and Traffic Control Signals
- 8D: Pathway Grade Crossings (New Chapter)



**Standard:** **DRAFT**

05 Traffic control devices, systems, and practices shall be consistent with the design and application of the Standards contained in this Manual.

06 Before any new highway–rail grade crossing traffic control system is installed or before modifications are made to an existing system, approval shall be obtained from the highway agency with the jurisdictional and/or statutory authority, and from the railroad company.

06A (DE Revision) The installation and maintenance of signs, signals and other traffic control devices installed within the railroad right-of-way shall be the responsibility of the railroad company.

## DE Revision:

- New standard indicating that the railroad company is responsible for installing and maintaining all traffic control devices within RR right-of-way in DE



### Section 8A.07 Quiet Zone Treatments at Highway-Rail Grade Crossings

#### Support:

01 49 CFR Part 222 (Use of Locomotive Horns at Highway-Rail Grade Crossings; Final Rule) prescribes Quiet Zone requirements and treatments.

#### Standard:

02 Any traffic control device and its application where used as part of a Quiet Zone shall comply with all applicable provisions of the MUTCD.

- New Section on “Quiet Zones”
- Supports new Final Rule (49 CFR Part 222) adopted by Federal RR Administration
- **All TCDs used as part of a Quiet Zone SHALL comply with the MUTCD**
  - This primarily refers to Section 8B.21 NO TRAIN HORN Sign or Plaque
- More discussion in Part 8B...

# CHAPTER 8B – SIGNS AND MARKINGS



## Important Distinction: Passive Versus Active Grade Crossings

- **Passive traffic control systems** consist of signs and pavement markings only

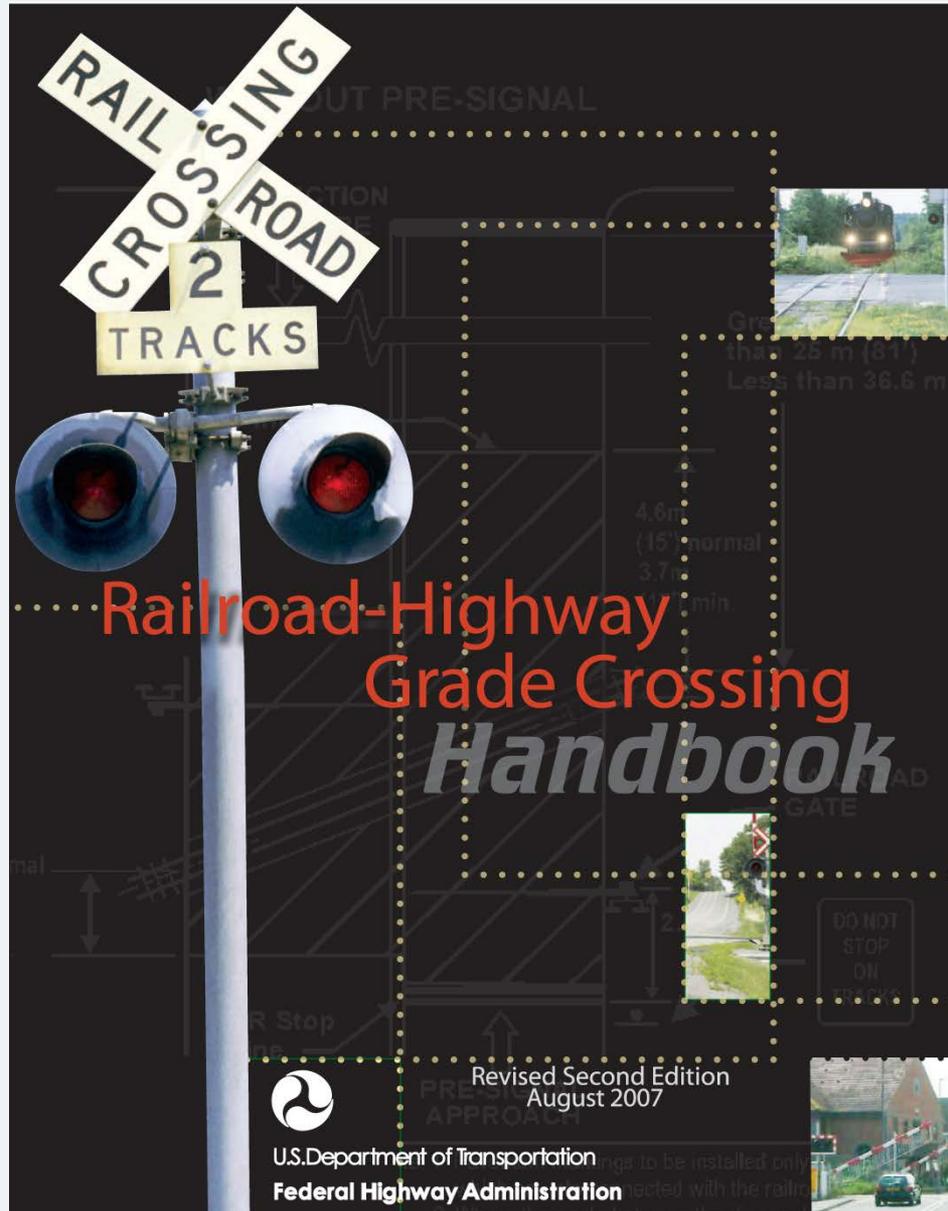
134. **Passive Grade Crossing**—a grade crossing where none of the automatic traffic control devices associated with an Active Grade Crossing Warning System are present and at which the traffic control devices consist entirely of signs and/or markings.

- **Active traffic control systems** consist of flashing light signals with or without gates

3. **Active Grade Crossing Warning System**—the flashing-light signals, with or without warning gates, together with the necessary control equipment used to inform road users of the approach or presence of rail traffic at grade crossings.

These are not new changes, just important definitions to remember when considering changes that follow

# CHAPTER 8B – SIGNS AND MARKINGS



# CHAPTER 8B – SIGNS AND MARKINGS

## PASSIVE



**Firetower Rd (Road 334A)**

These are not necessarily examples of correct applications of the MUTCD, but examples of existing crossings in Delaware

## ACTIVE



**W. North St at S. West St**

### Section 8B.04 Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings

#### Standard:

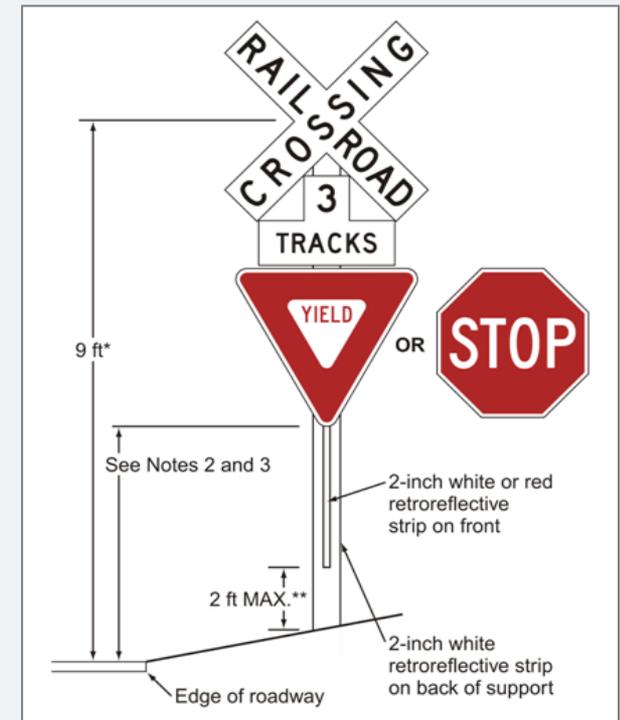
01 A grade crossing Crossbuck Assembly shall consist of a Crossbuck (R15-1) sign, and a Number of Tracks (R15-2P) plaque if two or more tracks are present, that complies with the provisions of Section 8B.03, and either a YIELD (R1-2) or STOP (R1-1) sign installed on the same support, except as provided in Paragraph 8. If used at a passive grade crossing, a YIELD or STOP sign shall be installed in compliance with the provisions of Part 2, Section 2B.10, and Figures 8B-2 and 8B-3.

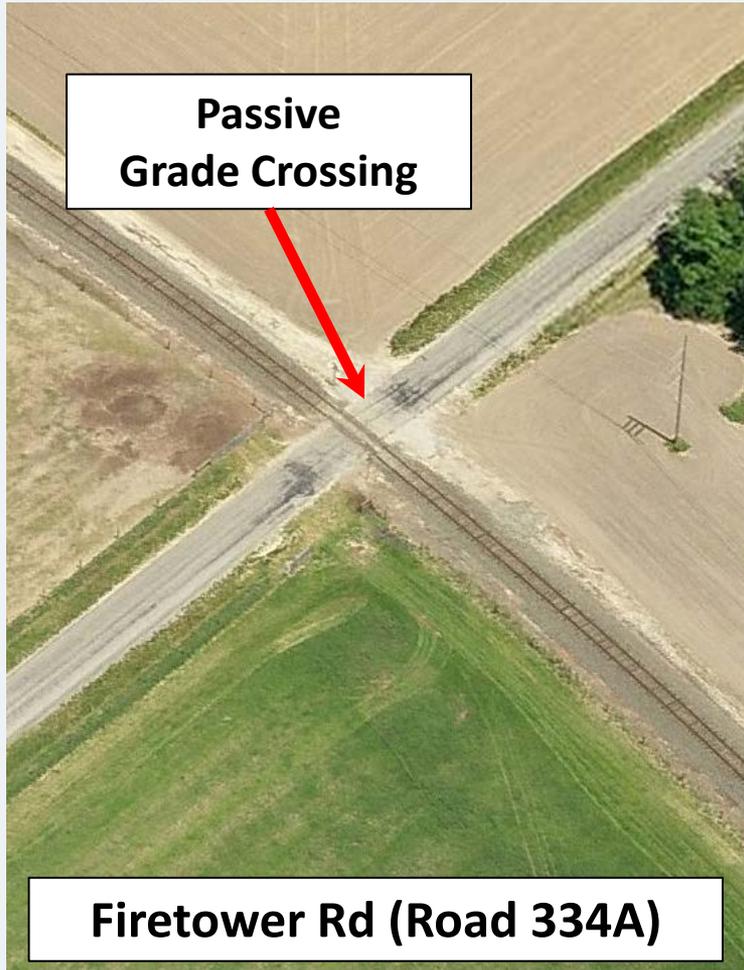
- **YIELD or STOP sign shall be installed at all passive grade crossings**
  - except when road users are directed by an authorized person

Significant change impacting all passive grade crossings

- Compliance date: 12/31/19

DelDOT sent letter to RR reminding them of new MUTCD requirements, and requesting notification when changes have been made





05 A YIELD sign shall be the default traffic control device for Crossbuck Assemblies on all highway approaches to passive grade crossings unless an engineering study performed by the regulatory agency or highway authority having jurisdiction over the roadway approach determines that a STOP sign is appropriate.

*Guidance:*

06 *The use of STOP signs at passive grade crossings should be limited to unusual conditions where requiring all highway vehicles to make a full stop is deemed essential by an engineering study. Among the factors that should be considered in the engineering study are the line of sight to approaching rail traffic (giving due consideration to seasonal crops or vegetation beyond both the highway and railroad or LRT rights-of-ways), the number of tracks, the speeds of trains or LRT equipment and highway vehicles, and the crash history at the grade crossing.*

- The YIELD sign shall be the default traffic control device at Passive Grade Crossings
- *Need for a STOP sign to be determined by an engineering study*
  - *Only for unusual conditions*
    - *Sight Distance*
    - *Number of Tracks*
    - *Speed of Trains*
    - *Crash History*

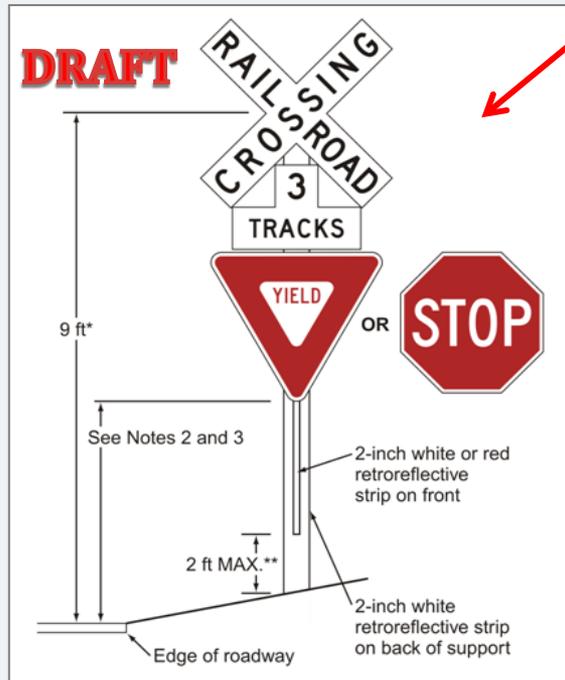


**Option:**

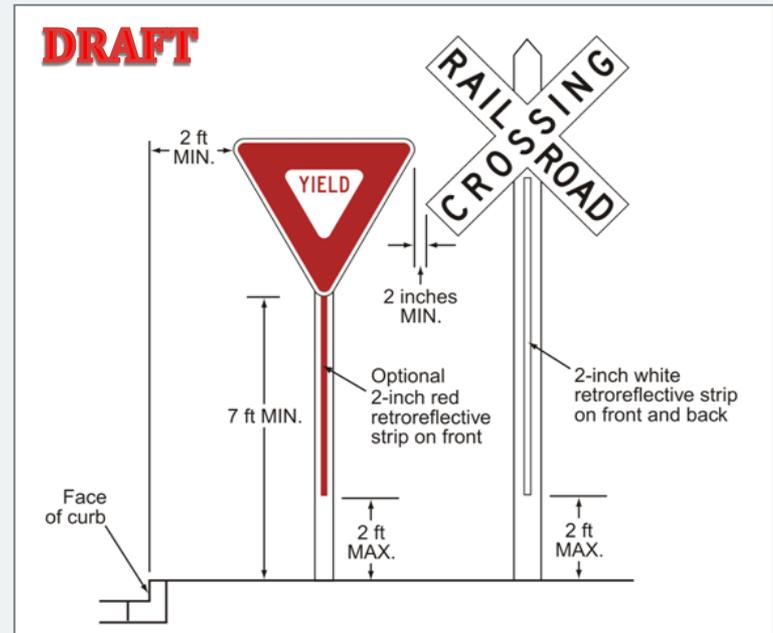
08 If a YIELD or STOP sign is installed for a Crossbuck Assembly at a grade crossing, it may be installed on the same support as the Crossbuck sign or it may be installed on a separate support at a point where the highway vehicle is to stop, or as near to that point as practical, but in either case, the YIELD or STOP sign is considered to be a part of the Crossbuck Assembly.

- The YIELD or STOP signs may be co-posted with the Crossbuck Assembly or installed on a separate support

DeIDOT's preferred approach, but up to the RR



**OR**



02 At all public highway-rail grade crossings that are not equipped with the active traffic control systems that are described in Chapter 8C, except crossings where road users are directed by an authorized person on the ground to not enter the crossing at all times that an approaching train is about to occupy the crossing, a Crossbuck Assembly shall be installed on the right-hand side of the highway on each approach to the highway-rail grade crossing.

03 If a Crossbuck sign is used on a highway approach to a public highway-LRT grade crossing that is not equipped with the active traffic control systems that are described in Chapter 8C, a Crossbuck Assembly shall be installed on the right-hand side of the highway on each approach to the highway-LRT grade crossing.

04 Where restricted sight distance or unfavorable highway geometry exists on an approach to a grade crossing that has a Crossbuck Assembly, or where there is a one-way multi-lane approach, an additional Crossbuck Assembly shall be installed on the left-hand side of the highway.

### Lateral Placement of Crossbuck Assembly

Remains mostly  
the same as Old  
Manual

#### Right-hand side:

- at all highway-rail and highway-LRT grade crossings not equipped with active traffic control systems.

#### Left-hand side:

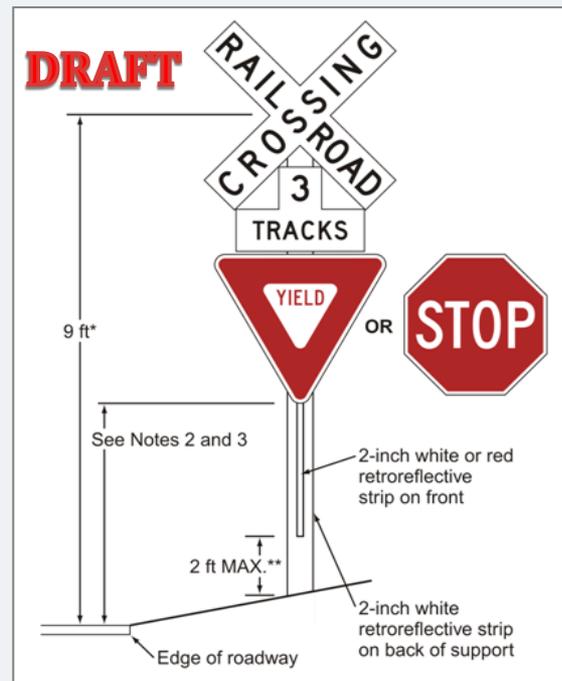
- *in addition* to the right-hand side sign,
- where restricted sight distance or unfavorable geometric conditions exist,
- or one-way multi-lane approach (new).

**Standard:**

- 09 If a YIELD or STOP sign is installed on an existing Crossbuck sign support, the minimum height, measured vertically from the bottom of the YIELD or STOP sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the YIELD or STOP sign to the elevation of the near edge of the traveled way, shall be 4 feet (see Figure 8B-2).
- 10 If a Crossbuck Assembly is installed on a new sign support (see Figure 8B-2) or if the YIELD or STOP sign is installed on a separate support (see Figure 8B-3), the minimum height, measured vertically from the bottom of the YIELD or STOP sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the YIELD or STOP sign to the elevation of the near edge of the traveled way, shall be 7 feet if the Crossbuck Assembly is installed in an area where parking or pedestrian movements are likely to occur.

## YIELD/STOP Sign Mounting Height

- On existing crossbuck supports:
  - Min. 4' above near edge of travelled way

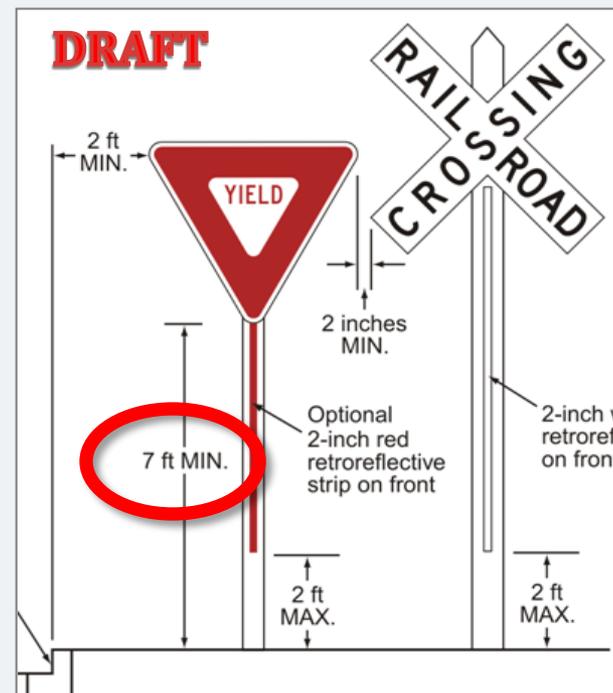


**Standard:**

- 09 If a **YIELD** or **STOP** sign is installed on an existing Crossbuck sign support, the minimum height, measured vertically from the bottom of the **YIELD** or **STOP** sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the **YIELD** or **STOP** sign to the elevation of the near edge of the traveled way, shall be 4 feet (see Figure 8B-2).
- 10 If a Crossbuck Assembly is installed on a new sign support (see Figure 8B-2) or if the **YIELD** or **STOP** sign is installed on a separate support (see Figure 8B-3), the minimum height, measured vertically from the bottom of the **YIELD** or **STOP** sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the **YIELD** or **STOP** sign to the elevation of the near edge of the traveled way, shall be 7 feet if the Crossbuck Assembly is installed in an area where parking or pedestrian movements are likely to occur.

## YIELD/STOP Sign Mounting Height

- On existing crossbuck supports:
  - Min. 4' above near edge of travelled way
- On new sign supports:
  - Rural: min. 5'
  - Urban (or in areas with pedestrian movements or parking): min. 7'



**Standard:**

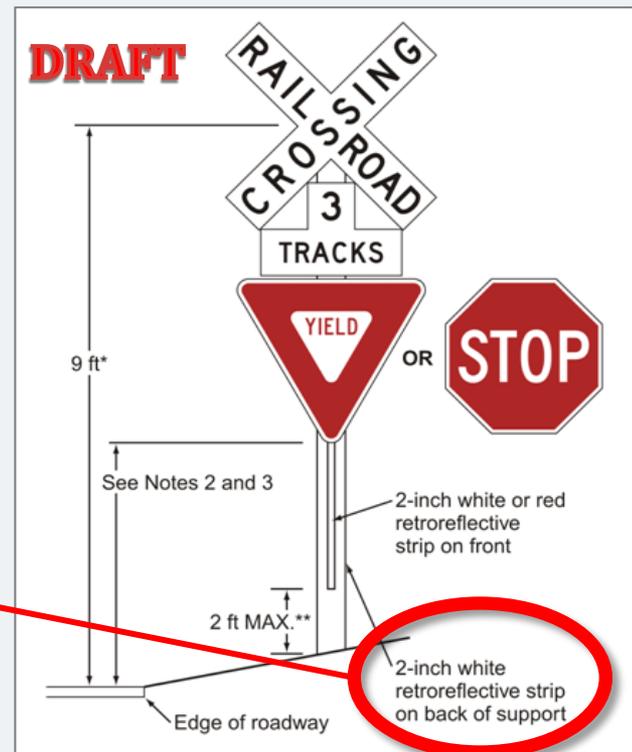
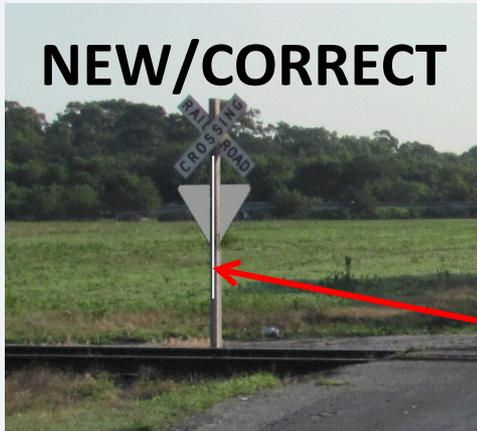
15 A vertical strip of retroreflective white material, not less than 2 inches in width, shall be used on each Crossbuck support at passive grade crossings for the full length of the back of the support from the Crossbuck sign or Number of Tracks plaque to within 2 feet above the ground, except as provided in Paragraph 16.

**Option:**

16 The vertical strip of retroreflective material may be omitted from the back sides of Crossbuck sign supports installed on one-way streets.

- A 2-inch wide white retroreflective strip shall be placed on the back of the crossbuck support
- May be omitted on signs along one-way streets

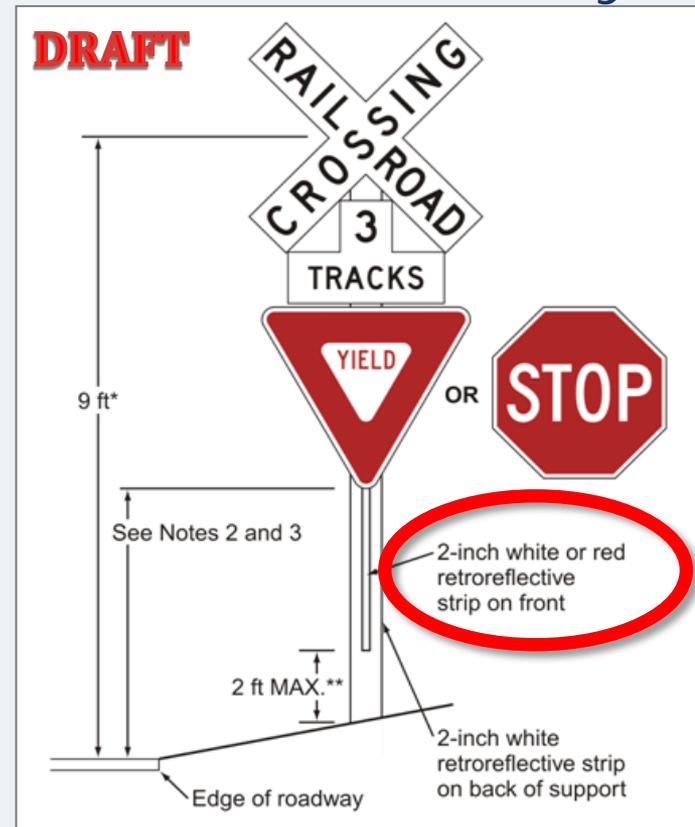
Remains the same as Old Manual



**Option:**

17 If a YIELD or STOP sign is installed on the same support as the Crossbuck sign, a vertical strip of red (see Section 2A.21) or white retroreflective material that is at least 2 inches wide may be used on the front of the support from the YIELD or STOP sign to within 2 feet above the ground.

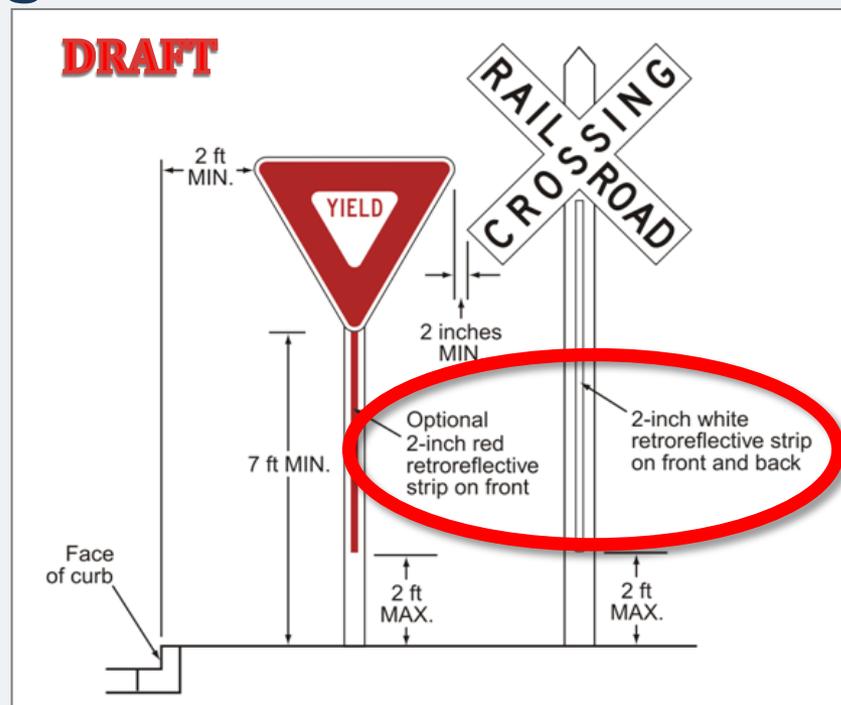
- Red or white vertical strip may be used in front of sign support with *combined* Crossbuck Assembly



**Standard:**

18 If a Crossbuck sign support at a passive grade crossing does not include a YIELD or STOP sign (either because the YIELD or STOP sign is placed on a separate support or because a YIELD or STOP sign is not present on the approach), a vertical strip of retroreflective white material, not less than 2 inches in width, shall be used for the full length of the front of the support from the Crossbuck sign or Number of Tracks plaque to within 2 feet above the ground.

- White vertical strip shall be used in front of sign support for Crossbuck Assembly with *separate* YIELD/STOP sign



03 A Yield Ahead (W3-2) or Stop Ahead (W3-1) Advance Warning sign (see Figure 2C-6) shall also be installed if the criteria for their installation given in Section 2C.36 is met. If a Yield Ahead or Stop Ahead sign is installed on the approach to the crossing, the W10-1 sign shall be installed upstream from the Yield Ahead or Stop Ahead sign. The Yield Ahead or Stop Ahead sign shall be located in accordance with Table 2C-4. The minimum distance between the signs shall be in accordance with Section 2C.05 and Table 2C-4.

- New Standard
- **Yield Ahead (W3-2) or Stop Ahead (W3-1) Advance Warning Sign shall be installed in accordance with Section 2C.36**
  - if the TCD is not visible for a distance (found in Table 2C-4) or
  - may be installed for additional emphasis
- **When used, it shall be installed downstream from the W10-1 sign**



W3-1



W3-2

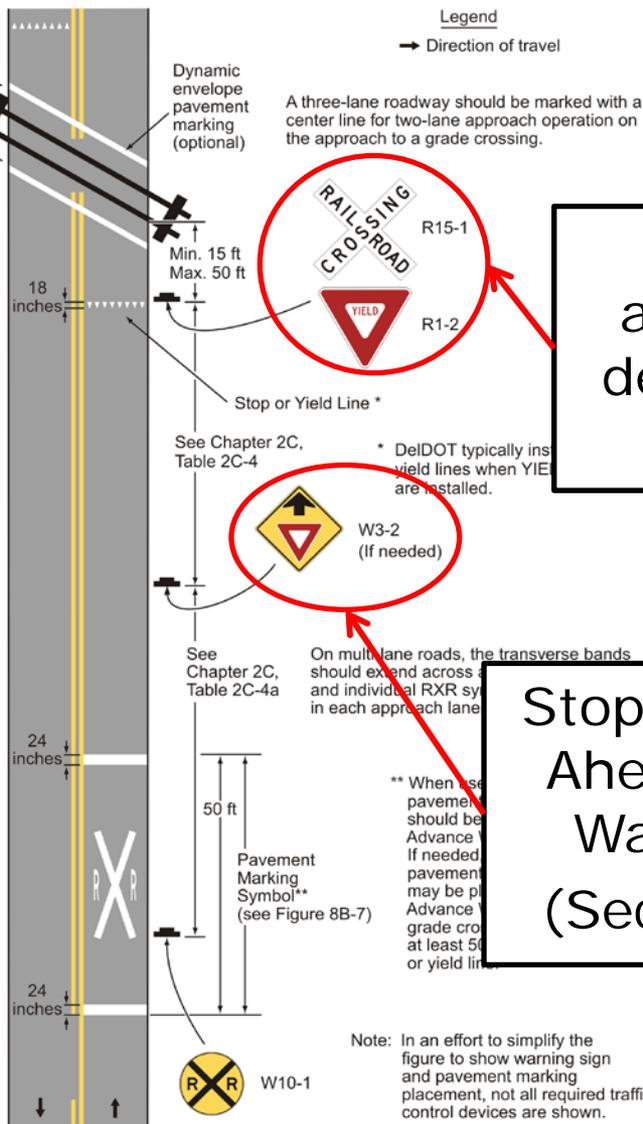


W10-1

# Section 8B.06 Grade Crossing Advance Warning Signs (W10 Series)

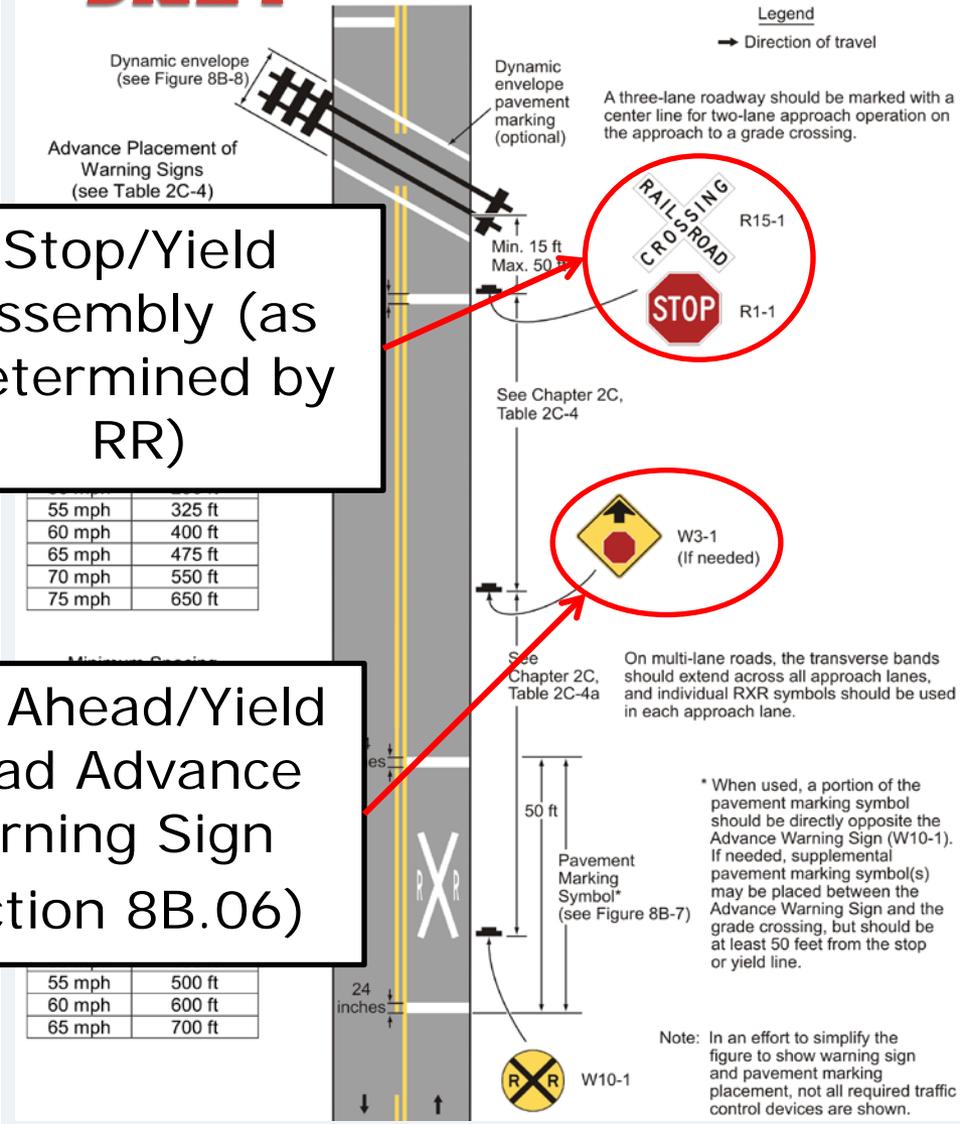
**Figure 8B-6. Example of Placement of Warning Signs and Pavement Markings for Passive Grade Crossings with Yield Control (Delaware Revision)**

**DRAFT**



**Figure 8B-6A. Example of Placement of Warning Signs and Pavement Markings for Passive Grade Crossings with Stop Control (Delaware Revision)**

**DRAFT**



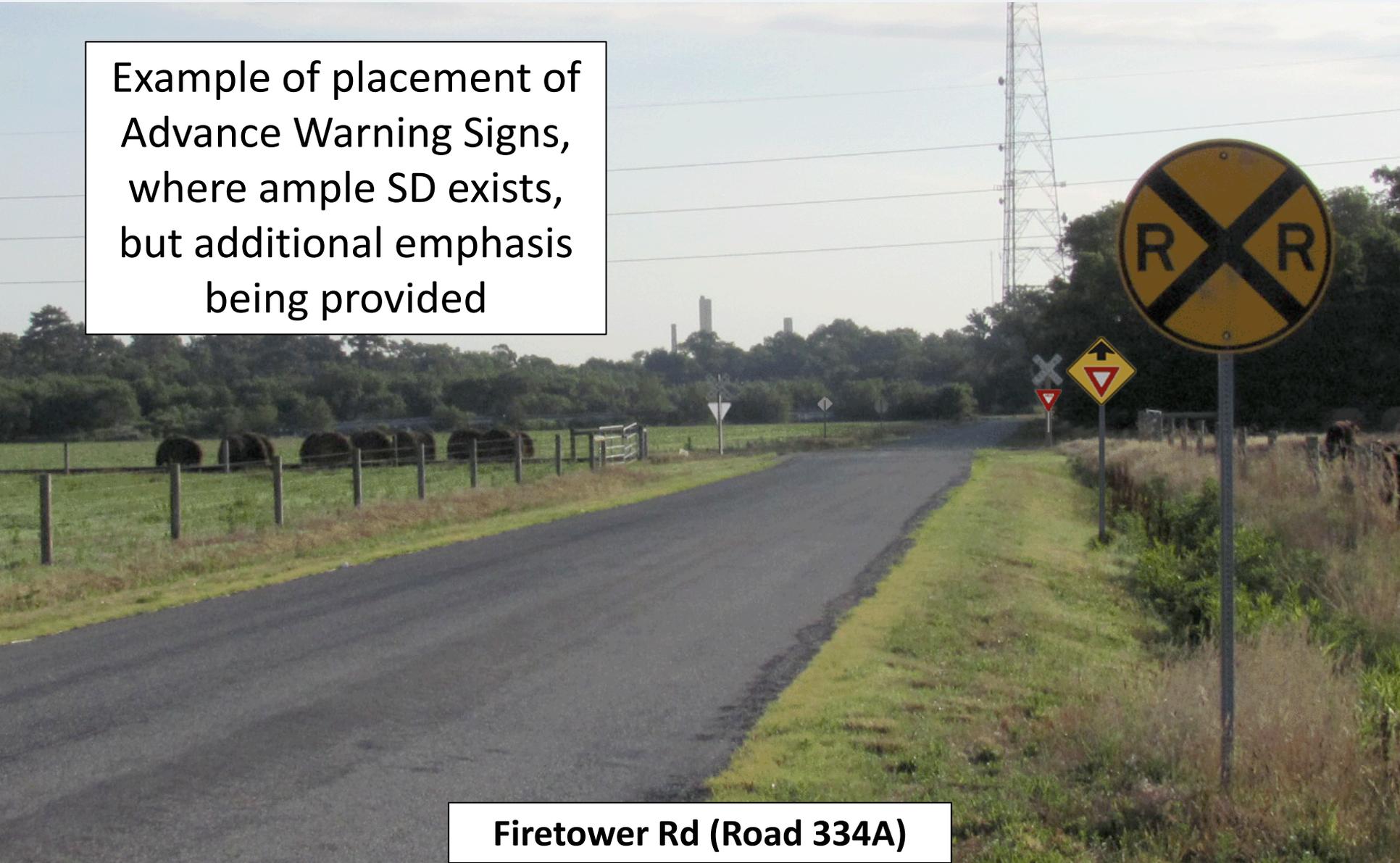
Stop/Yield assembly (as determined by RR)

Stop Ahead/Yield Ahead Advance Warning Sign (Section 8B.06)

Minimum Spacing between Warning Signs (see Table 2C-4a)

Posted or 85 <sup>th</sup> Percentile Speed	Minimum Spacing
20 mph	50 ft
25 mph	75 ft
30 mph	100 ft
35 mph	150 ft
40 mph	200 ft
45 mph	300 ft
50 mph	400 ft
55 mph	500 ft
60 mph	600 ft
65 mph	700 ft

Example of placement of Advance Warning Signs, where ample SD exists, but additional emphasis being provided



**Firetower Rd (Road 334A)**

**Standard:** **DRAFT**

04 (DE Revision) In Delaware, traffic control signals displaying red, yellow and green signal indications shall be installed at all highway-rail grade crossings designated as exempt crossings.

**Support:**

05 (DE Revision) Pursuant to 49 CFR Ch. III Subpart B §392.10, commercial motor vehicles need not stop at highway-rail grade crossings controlled by a functioning traffic signal transmitting a green indication. Furthermore, pursuant to Delaware Code, Title 21, Chapter 41, Subchapter VIII, §4163, the driver of any motor vehicle carrying passengers for hire, school bus carrying students or vehicle carrying hazardous materials is not required to stop at a highway rail grade crossing at which traffic is regulated by a traffic control signal or an official traffic control device, such as an EXEMPT (W10-1aP) sign.

**DE Revision:**

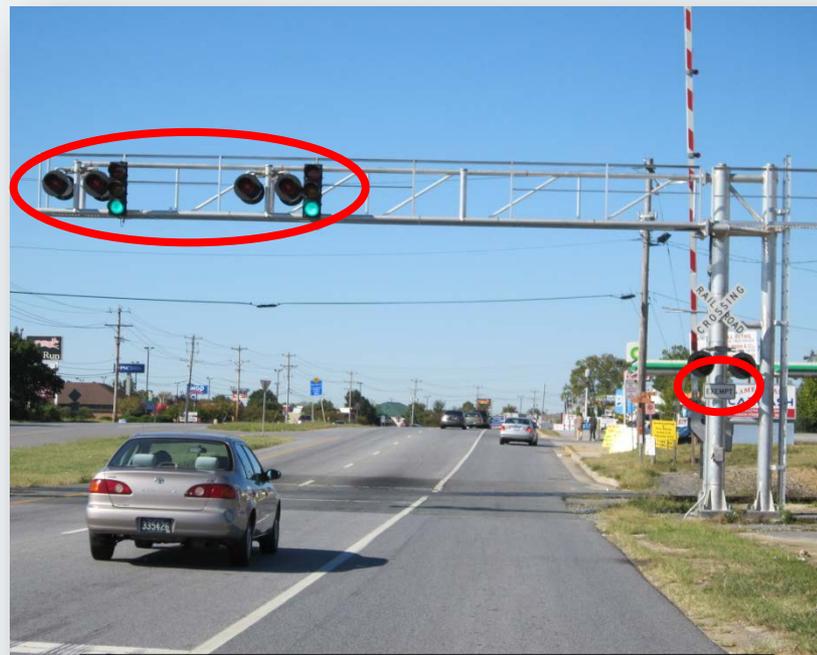
- New standard indicating that traffic control signals shall be installed at all highway-rail grade crossings designated as exempt crossings



R15-3P

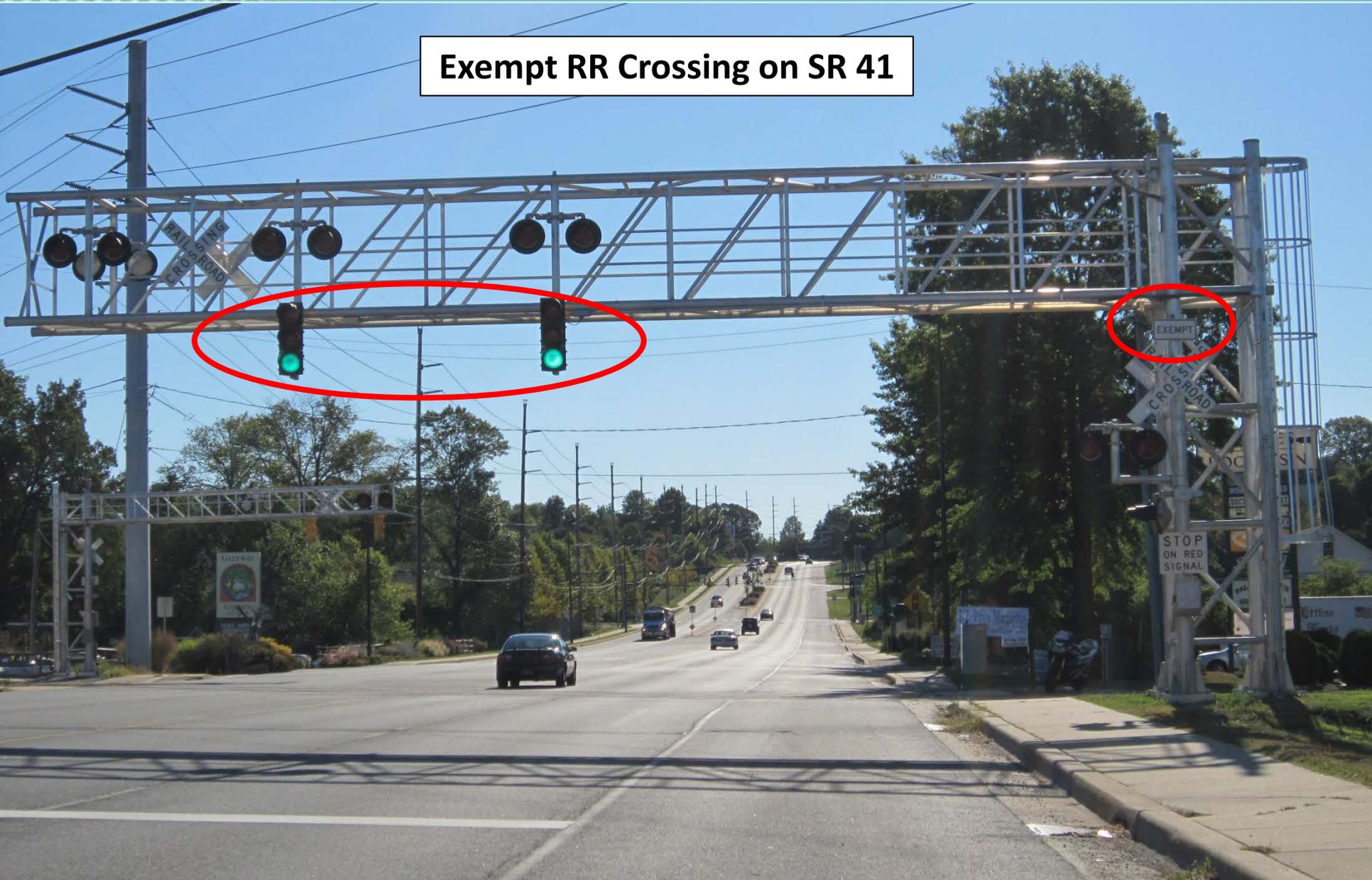


W10-1aP



**Exempt RR Crossing on US 40**

**Exempt RR Crossing on SR 41**



## Sections 8B.09 DO NOT STOP ON TRACKS SIGN (R8-8)

### Guidance:

02 If a STOP or YIELD sign is installed at a location, including at a circular intersection, that is downstream from the grade crossing such that highway vehicle queues are likely to extend beyond the tracks, a DO NOT STOP ON TRACKS sign (R8-8) should be used.

- *Should be used if a STOP or YIELD sign is located downstream from the grade crossing such that queues are likely to extend beyond tracks*



R8-8

**Reybold near SR 72**



Possible location for a DO NOT STOP ON TRACKS sign (R8-8)



**W. North St at S. West St in Dover**

## Sections 8B.09 DO NOT STOP ON TRACKS SIGN (R8-8)

Option: **DRAFT**

04 (DE Revision) On divided highways and one-way streets, a second DO NOT STOP ON TRACKS sign may be placed on the near or far left-hand side of the highway at the grade crossing, or overhead, to further improve visibility of the sign.

### DE Revision:

- New option that DO NOT STOP ON TRACKS signs may be placed overhead to improve visibility of the sign



R8-8

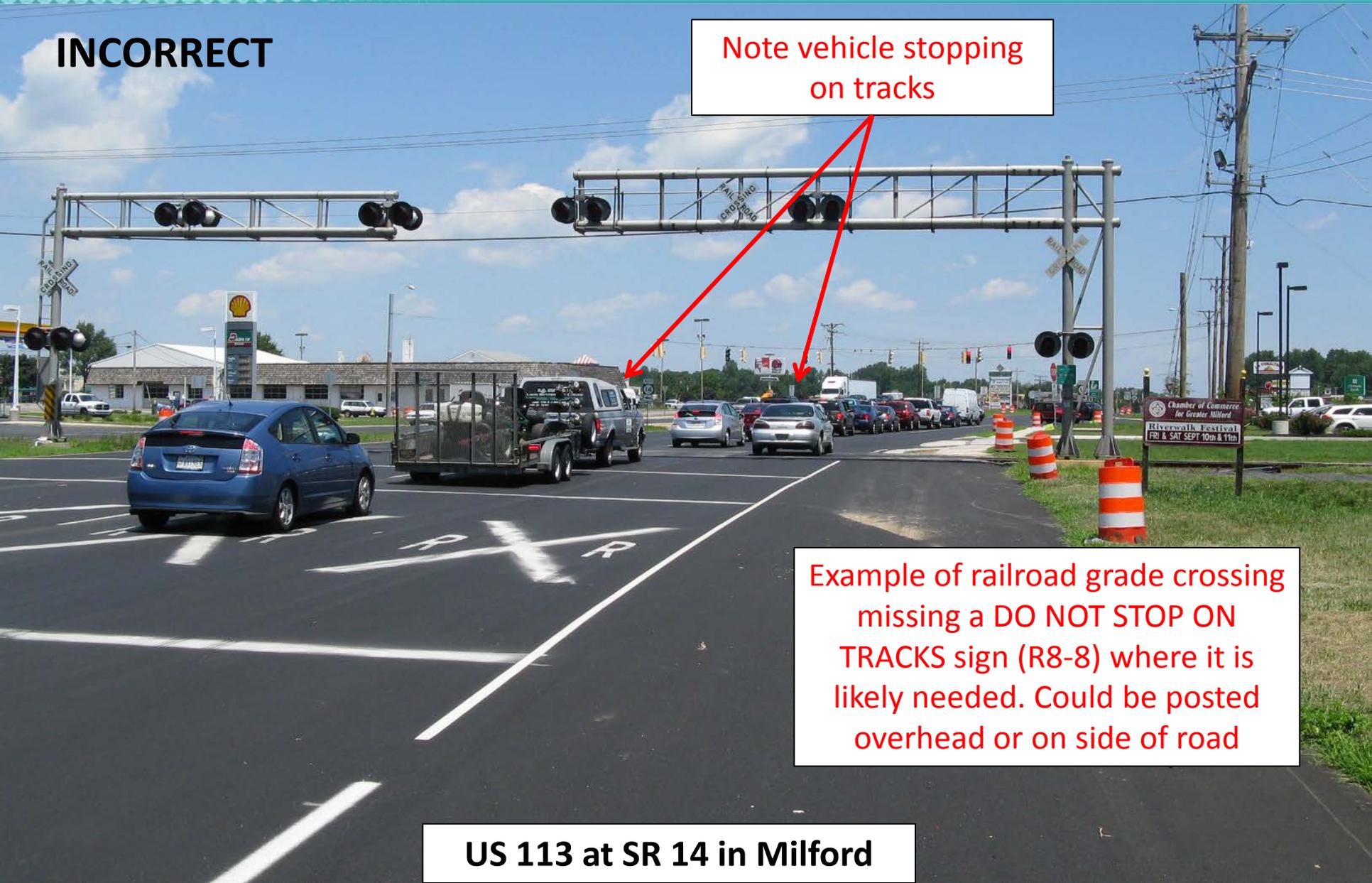
Although needs to be replaced with black on white sign



# Sections 8B.09 DO NOT STOP ON TRACKS SIGN (R8-8)

**INCORRECT**

Note vehicle stopping on tracks



Example of railroad grade crossing missing a DO NOT STOP ON TRACKS sign (R8-8) where it is likely needed. Could be posted overhead or on side of road

**US 113 at SR 14 in Milford**

# Sections 8B.09 DO NOT STOP ON TRACKS SIGN (R8-8)



Example of older DO NOT STOP ON TRACKS sign near another non-standard DO NOT STOP ON RAILROAD CROSSING sign

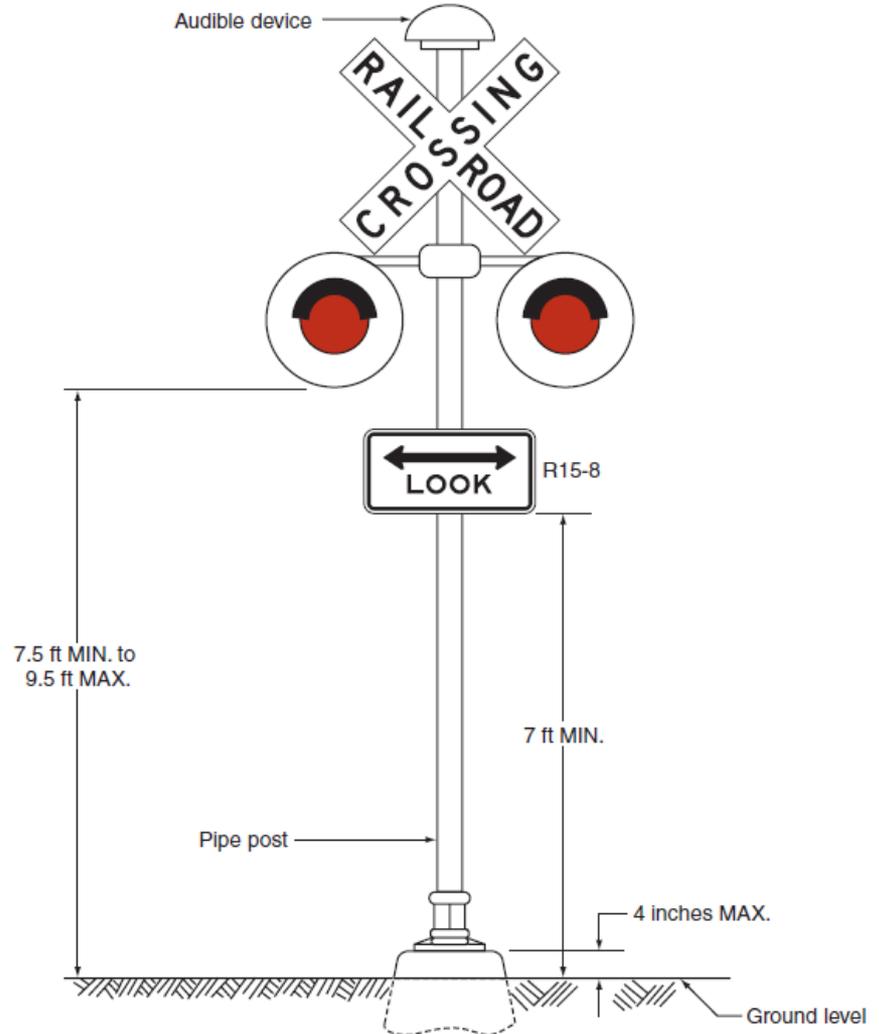
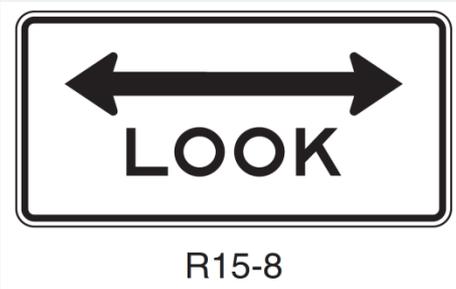
**SR 896 - Mt. Pleasant**

# 8B.17 LOOK Sign (R15-8)

*Guidance:*

02 A LOOK sign should not be mounted as a supplemental plaque on a Crossbuck Assembly that has a YIELD or STOP sign mounted on the same support as the Crossbuck.

- Should not be mounted on a Crossbuck Assembly that has a STOP or YIELD sign



## Section 8B.18 Emergency Notification Sign (I-13)

### Standard:

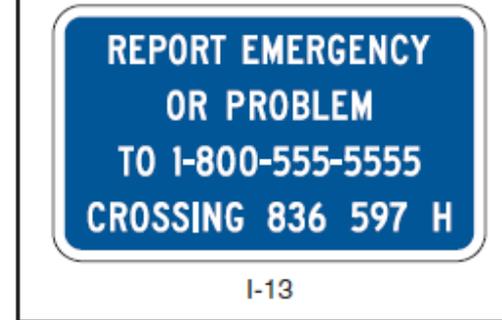
02 When Emergency Notification signs are used at a highway-rail grade crossing, they shall, at a minimum, include the USDOT grade crossing inventory number and the emergency contact telephone number.

03 When Emergency Notification signs are used at a highway-LRT grade crossing, they shall, at a minimum, include a unique crossing identifier and the emergency contact telephone number.

04 Emergency Notification Signs shall have a white legend and border on a blue background.

05 The Emergency Notification signs shall be positioned so as to not obstruct any traffic control devices or limit the view of rail traffic approaching the grade crossing.

Figure 8B-5. Example of an Emergency Notification Sign



Use of signs remains a **SHOULD** Condition.  
\* RR responsibility to install \*

- When used, shall include:
  - USDOT grade crossing inventory number
  - Emergency contact telephone number
- Shall have a white legend and border on a blue background
- Shall be positioned to
  - not obstruct any traffic control devices
  - not limit the view of approaching rail traffic

## Section 8B.18 Emergency Notification Sign (I-13)

### *Guidance:*

- 06 *Emergency Notification signs should be retroreflective.*
- 07 *Emergency Notification signs should be oriented so as to face highway vehicles stopped on or at the grade crossing or on the traveled way near the grade crossing.*
- 08 *At station crossings, Emergency Notification signs or information should be posted in a conspicuous location.*
- 09 *Emergency Notification signs mounted on Crossbuck Assemblies or signal masts should only be large enough to provide the necessary contact information. Use of larger signs that might obstruct the view of rail traffic or other highway vehicles should be avoided.*

### *Should be:*

- *Retroreflective*
- *Oriented to face highway vehicles*
- *Posted in a conspicuous location*
- *Large enough to provide necessary contact information*
- *Avoid use of larger signs that might obstruct the view of traffic*

Figure 8B-5. Example of an Emergency Notification Sign



I-13

# Section 8B.18 Emergency Notification Sign (I-13)

**INCORRECT**



**CORRECT**



**SR 10, west of Camden**

- Section 8B.21 NO TRAIN HORN plaque remains from prior MUTCD
- New sign (W10-9) added for locations where a W10-1 sign is not present, so use of W10-9P not possible.
- **Requires (shall) either the sign or plaque to be installed in each direction (*new*) at all locations where quiet zones have been established per 8A.07**

**NEW**



W10-9



W10-1



W10-9P



## Section 8B.25 – Skewed Crossing Sign (W10-12)

Option: **DRAFT**

01 The Skewed Crossing (W10-12) sign (see Figure 8B-4) may be used at a skewed grade crossing to warn road users that the tracks are not perpendicular to the highway.

01A (DE Revision) The CYCLES USE CAUTION (W10-12P-DE) plaque may be used to supplement the W10-12 sign.

### DE Revision:

- Option added to allow use of CYCLES USE CAUTION (W10-12P-DE) plaque to supplement the Skewed grade crossing sign
- This plaque was carried forward from the old DE MUTCD



W10-12P-DE \*

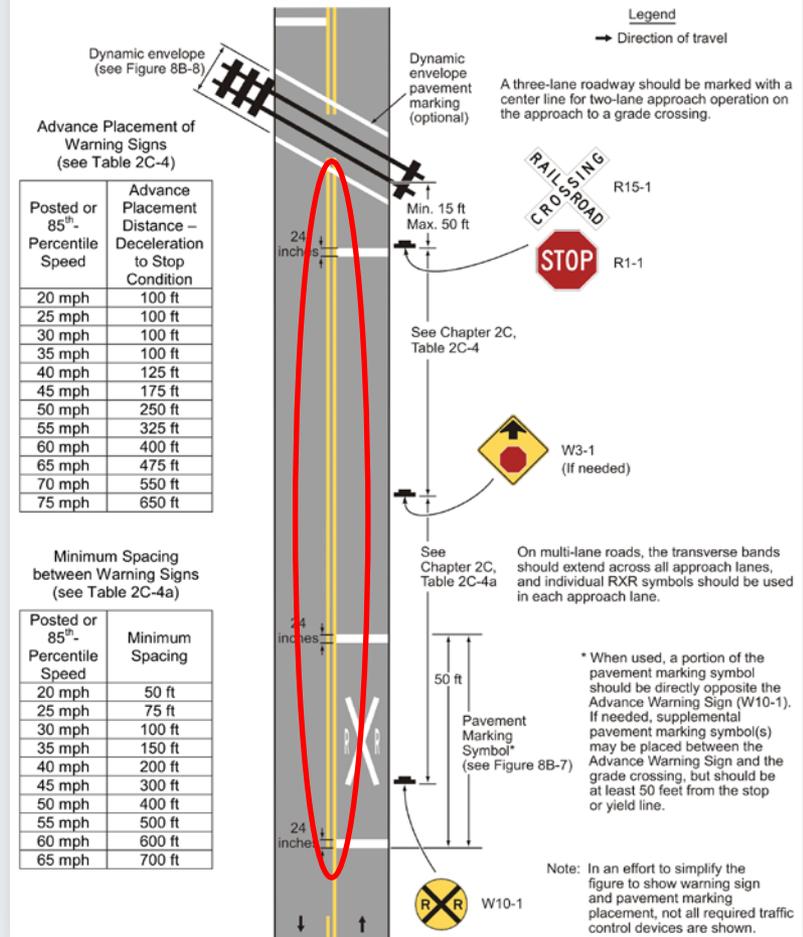
Standard: **DRAFT**

02 (DE Revision) On paved roadways, pavement markings in advance of a grade crossing shall consist of an X, the letters RR, a no-passing zone marking for both directions of travel (on two-lane, two-way highways with center line markings in compliance with Section 3B.01), and certain transverse lines as shown in Figures 8B-6, 8B-6A, 8B-6B, and 8B-7.

## DE Revision:

- Revised the standard to require no passing in both directions in advance of a RR grade crossing
- This DE Revision was also carried forward from the old DE MUTCD

Figure 8B-6A. Example of Placement of Warning Signs and Pavement Markings for Passive Grade Crossings with Stop Control (Delaware Revision)



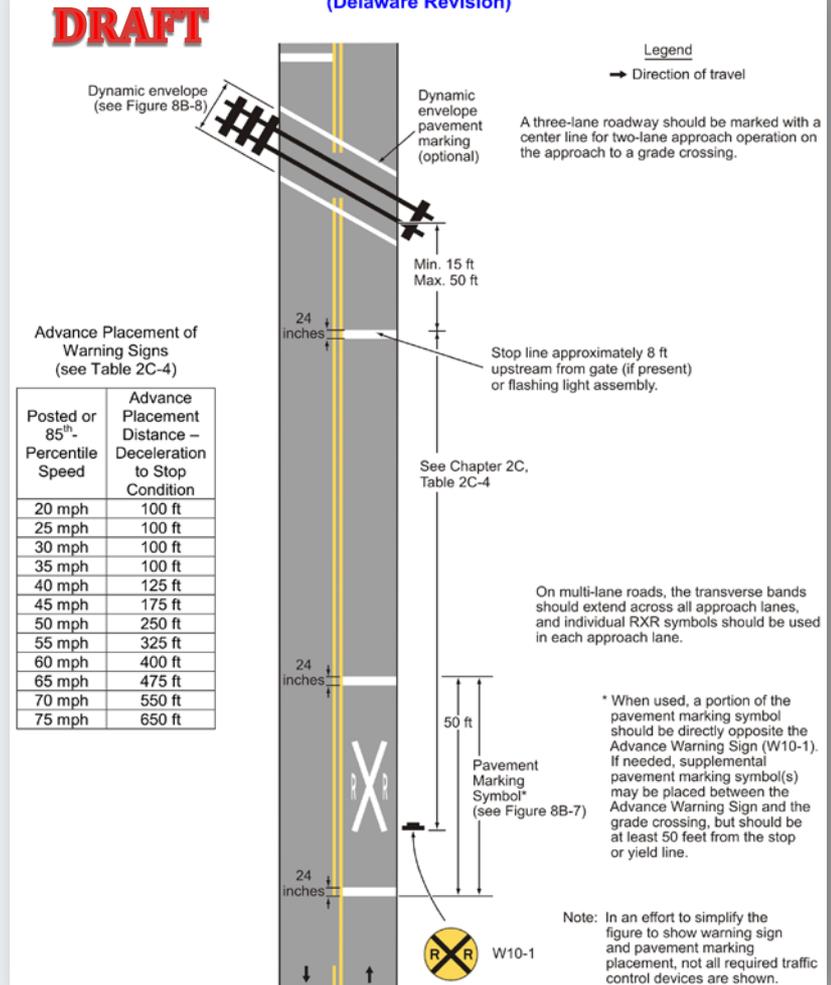
**Standard:**

01 On paved roadways at grade crossings that are equipped with active control devices such as flashing-light signals, gates, or traffic control signals, a stop line (see Section 3B.16) shall be installed to indicate the point behind which highway vehicles are or might be required to stop.

**New Standard:**

- Crossings equipped with active control devices (flashing lights): a stop line shall be installed

Figure 8B-6B. Example of Placement of Warning Signs and Pavement Markings for Active Grade Crossings (Delaware Revision)



# Section 8B.28 Stop and Yield Lines

Option: **DRAFT**

04 On paved roadway approaches to passive grade crossings where a YIELD sign is installed in conjunction with the Crossbuck sign, a yield line (see Section 3B.16) or a stop line may be installed to indicate the point behind which highway vehicles are required to yield or stop or as near to that point as practical.

Support:

04A (DE Revision) In Delaware, at passive grade crossings on state-maintained roads, DelDOT typically installs yield lines when YIELD signs are installed in conjunction with the Crossbuck Assembly.

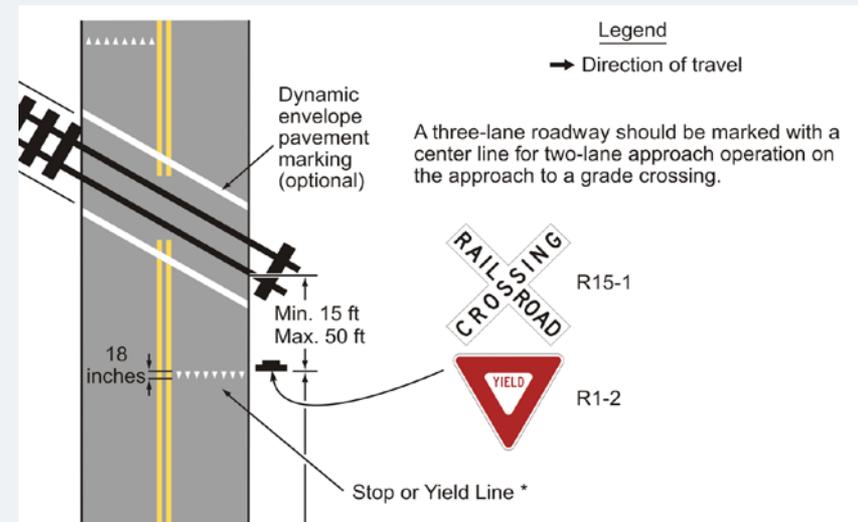
Guidance:

05 (DE Revision) If a yield line is used, it should be a transverse line (see Figure 3B-16) at a right angle to the traveled way and should be placed no closer than 15 feet in advance of and no more than 50 feet away from the nearest rail (see Figure 8B-6).

Passive crossings: May use either Stop or Yield line with YIELD sign

## DE Revisions:

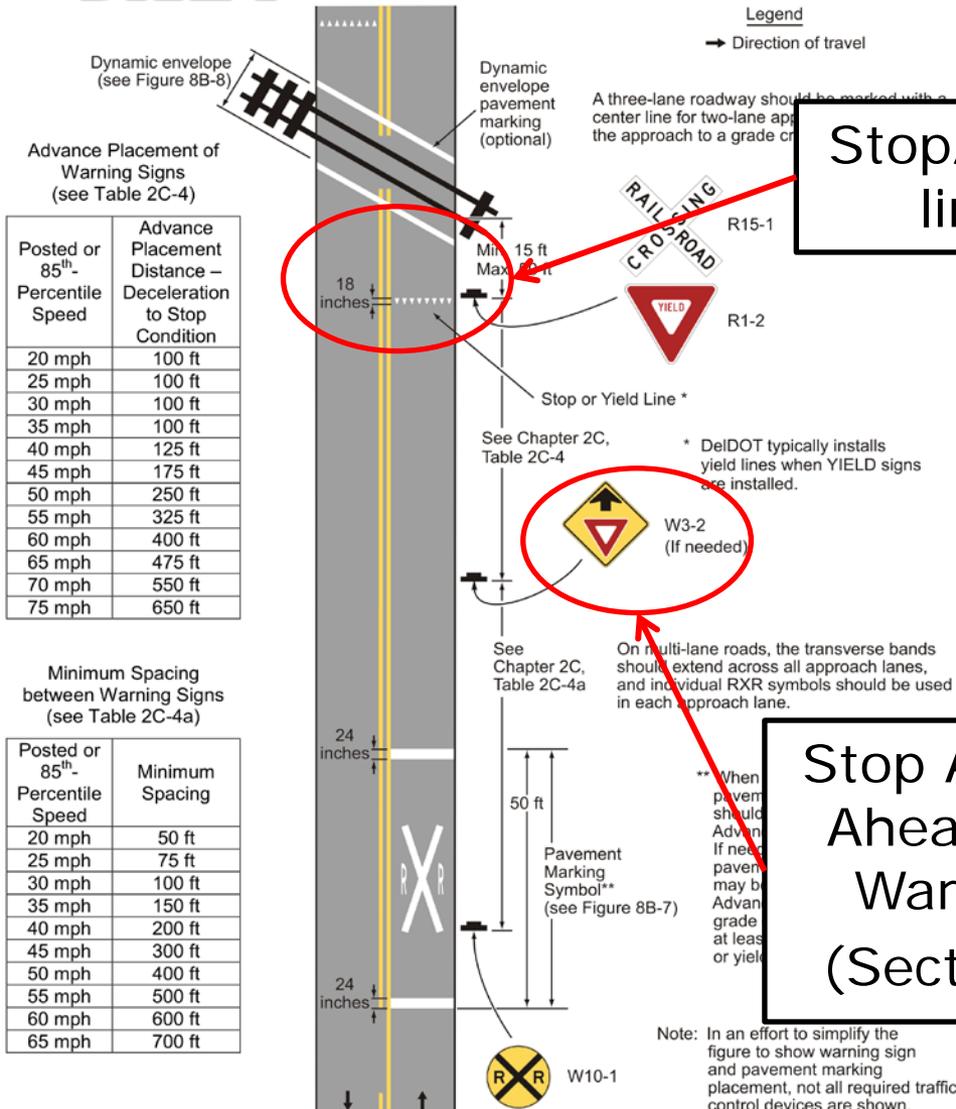
- In DE, Yield lines are typically installed with YIELD signs
- Stop & Yield lines should be placed between 15 and 50 feet from the nearest rail



# Section 8B.28 Stop and Yield Lines

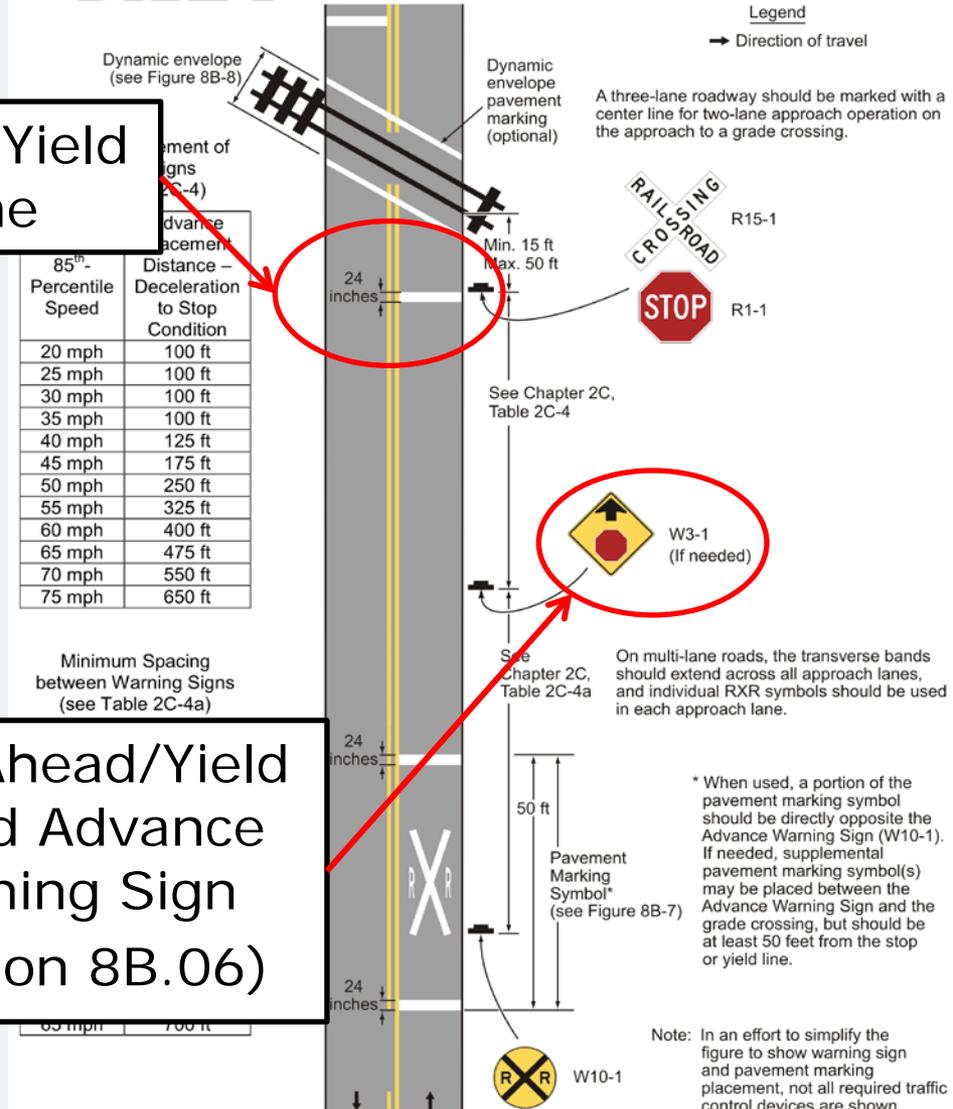
**Figure 8B-6. Example of Placement of Warning Signs and Pavement Markings for Passive Grade Crossings with Yield Control (Delaware Revision)**

**DRAFT**



**Figure 8B-6A. Example of Placement of Warning Signs and Pavement Markings for Passive Grade Crossings with Stop Control (Delaware Revision)**

**DRAFT**



Stop/Yield line

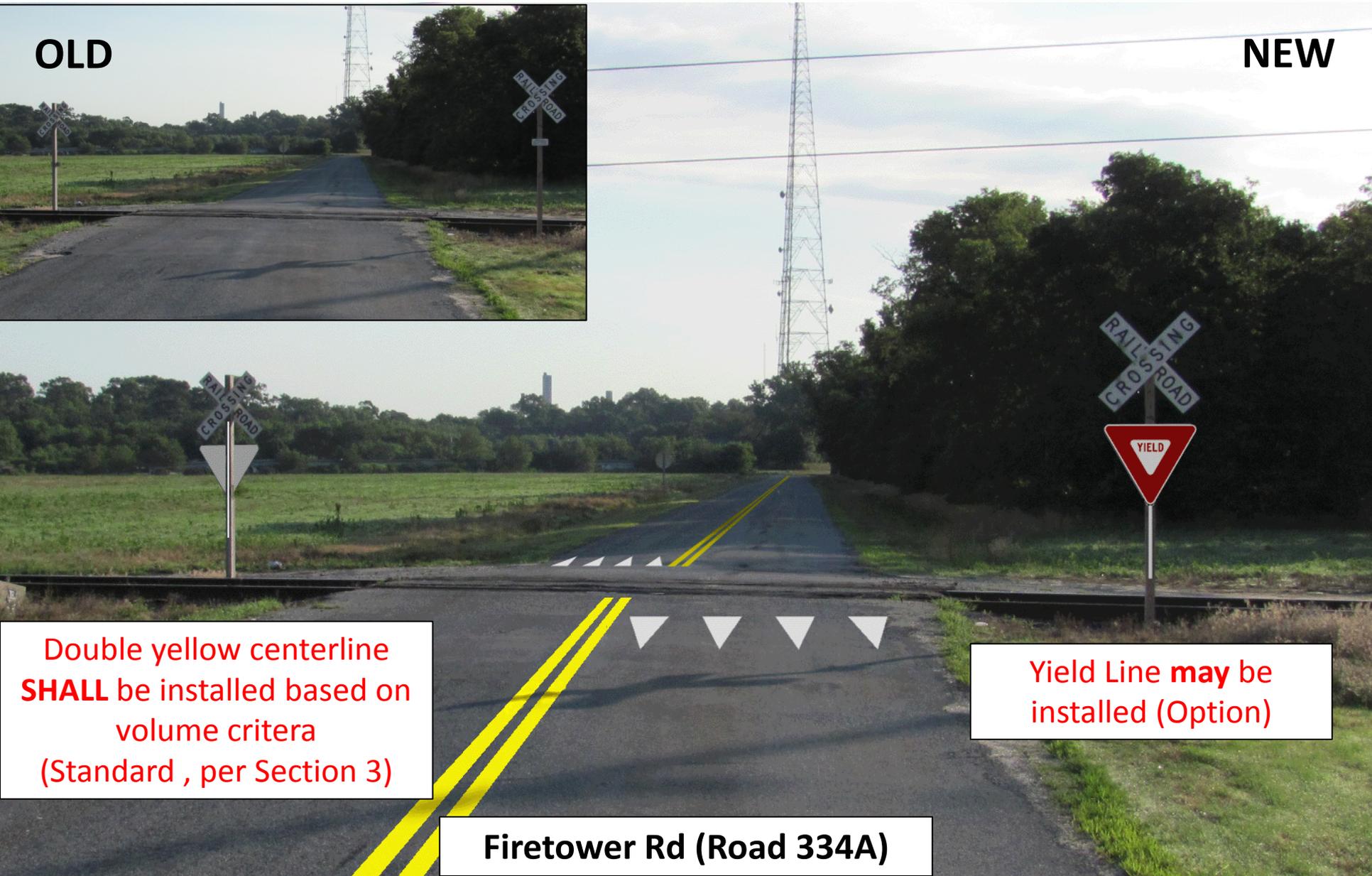
Stop Ahead/Yield Ahead Advance Warning Sign (Section 8B.06)

# Section 8B.28 Stop and Yield Lines

**OLD**



**NEW**



Double yellow centerline  
**SHALL** be installed based on  
volume criteria  
(Standard , per Section 3)

Yield Line **may** be  
installed (Option)

**Firetower Rd (Road 334A)**

# Section 8B.28 Stop and Yield Lines



Double yellow centerline **SHALL** be installed based on volume criteria (Standard , per Section 3)

Yield Line may be installed (Option)

missing RR pavement marking symbol **SHALL** be installed (per Standard in current MUTCD) if Posted Speed > 40 mph

Firetower Rd (Road 334A)



## Section 8C.02 Flashing-Light Signals

### Standard:

11 References to lenses in this Section shall not be used to limit flashing-light signal optical units to incandescent lamps within optical assemblies that include lenses.

### Support:

12 Research has resulted in flashing-light signal optical units that are not lenses, such as, but not limited to, light emitting diode (LED) flashing-light signal modules.

- “Lenses” ***shall*** not limit flashing-light signal optical units to incandescent lamps with assemblies that include lenses.
- Example: LED flashing light signals

### **DRAFT**

### Guidance:

17 (DE Revision) *Flashing-light signals should be designed in accordance with the Roadside Design Guide, either as crashworthy, with positive protection, or placed outside the clear zone.*

### DE Revision:

- *DE Guidance: Flashing-light signals should be designed with positive protection or be placed outside the clear zone*

Positive protection?? Really??

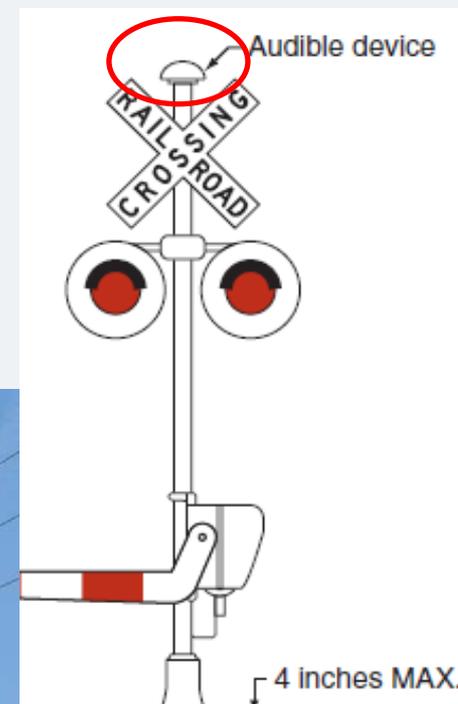


Wyoming

## Standard:

03 If flashing-light signals are in operation at a highway-LRT crossing that is used by pedestrians, bicyclists, and/or other non-motorized road users, an audible device such as a bell shall also be provided and shall be operated in conjunction with the flashing-light signals.

- **Shall** provide an audible device such as a bell at active LRT crossings used by pedestrians, bicyclists and/or non-motorized road users.
- (was option, now standard)
- Remains an option for RR grade crossings
- Also a **standard** for active pathway grade crossings (see Chapter 8D)



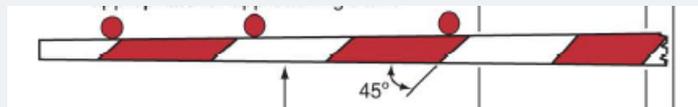
# Section 8C.04 Automatic Gates

05 Gate arms shall be fully retroreflectorized on both sides and shall have vertical stripes alternately red and white at 16-inch intervals measured horizontally.

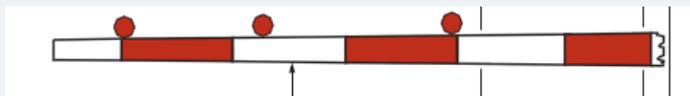
Support:

06 It is acceptable to replace a damaged gate with a gate having vertical stripes even if the other existing gates at the same grade crossing have diagonal stripes; however, it is also acceptable to replace a damaged gate with a gate having diagonal stripes if the other existing gates at the same grade crossing have diagonal stripes in order to maintain consistency per the provisions of Paragraph 24 of the Introduction.

- **Shall have vertical stripes instead of 45 degree diagonal stripes.**
- A damaged gate can be replaced with
  - a gate having vertical stripes or
  - a gate having diagonal stripes to maintain consistency with other existing gates at the same grade crossing



Old



New



## Section 8C.07 Wayside Horn Systems

**255. Wayside Horn System**—a stationary horn (or series of horns) located at a grade crossing that is used in conjunction with train-activated or light rail transit-activated warning systems to provide audible warning of approaching rail traffic to road users on the highway or pathway approaches to a grade crossing, either as a supplement or alternative to the sounding of a locomotive horn.

**Wayside Horn Systems:** a stationary horn (or series of horns) located at a grade crossing to warn of approaching rail traffic.

### Option:

01 A wayside horn system (see definition in Section 1A.13) may be installed in compliance with 49 CFR Part 222 to provide audible warning directed toward the road users at a highway-rail or highway-LRT grade crossing or at a pathway grade crossing.

### Standard:

02 Wayside horn systems used at grade crossings where the locomotive horn is not sounded shall be equipped and shall operate in compliance with the requirements of Appendix E to 49 CFR Part 222.

### Guidance:

03 *The same lateral clearance and roadside safety features should apply to wayside horn systems as described in the Standards contained in Section 8C.01. Wayside horn systems, when mounted on a separate pole assembly, should be installed no closer than 15 feet from the center of the nearest track and should be positioned to not obstruct the motorists' line of sight of the flashing-light signals.*

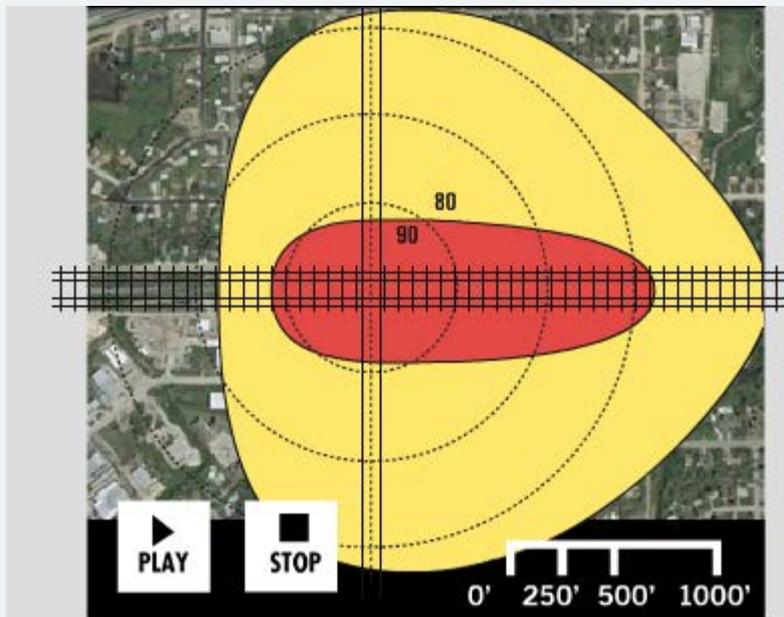


- New Section
- May be installed to provide audible warning
- **Required (*shall*) to operate according to the requirements defined in Section 8A.07, when used in quiet zones**
- Lateral clearance as described in Section 8C.01
- Should be installed no closer than 15 feet from the center of the nearest track.



# Section 8C.07 Wayside Horn Systems

## TRAIN HORN



## WAYSIDE HORN



NOISE POLLUTION COLORS ● 90 DECIBELS AND ABOVE ● 80 - 90 DECIBELS

## Standard:

08 Information regarding the type of preemption and any related timing parameters shall be provided to the railroad company so that they can design the appropriate train detection circuitry.

- Type of preemption and any related timing parameters shall be provided to the railroad company
- Note: DeIDOT is in the process of upgrading signal cabinets (circuitry) at all intersections near Highway-Rail grade crossings to become MUTCD compliant.



### Within or In Close Proximity to Circular Intersections

#### Support:

- 01 At circular intersections, such as roundabouts and traffic circles, that include or are within close proximity to a grade crossing, a queue of vehicular traffic could cause highway vehicles to stop on the grade crossing.

#### Standard:

- 02 Where circular intersections include or are within 200 feet of a grade crossing, an engineering study shall be made to determine if queuing could impact the grade crossing. If traffic queues impact the grade crossing, provisions shall be made to clear highway traffic from the grade crossing prior to the arrival of rail traffic.

- New Section
- Circular intersections – roundabouts and traffic circles
- **Circular Intersections within 200 feet of a grade crossing:**
  - Shall require an engineering study to determine if queuing could impact the grade crossing.
  - If impacted, provisions shall be made to clear highway traffic from the crossing prior to the arrival of rail traffic

### Within or In Close Proximity to Circular Intersections

#### Support:

03 Among the actions that can be taken to keep the grade crossing clear of traffic or to clear traffic from the grade crossing prior to the arrival of rail traffic are the following:

- A. Elimination of the circular intersection,
- B. Geometric design revisions,
- C. Grade crossing regulatory and warning devices,
- D. Highway traffic signals,
- E. Traffic metering devices,
- F. Activated signs, or
- G. A combination of these or other actions.

- Actions that can be taken to clear the traffic from the grade crossing
  - Elimination of the circular intersection
  - Geometric design revisions
  - Grade crossing regulatory and warning signs
  - Highway traffic signals
  - Traffic metering devices
  - Activated signs
- A combination of these or other actions

One possible solution if your roundabout is close to a railroad:



# CHAPTER 8D. PATHWAY GRADE CROSSINGS



- New Chapter
- Pathway vs. Sidewalk (DelDOT's definition)
  - A walkway located immediately adjacent to a roadway alignment is called a sidewalk
  - A walkway, bikeway or mixed-use path located away from a roadway alignment is called a pathway
- Sidewalk grade crossings are covered under prior sections of Part 8
- Pathway grade crossings now specifically addressed in Chapter 8D

# CHAPTER 8D. PATHWAY GRADE CROSSINGS



**SIDEWALK  
(GRADE CROSSING)**

**Walker Rd in Dover**



**PATHWAY**

**James Hall Trail in Newark**

## Section 8D.01 Purpose

Support: **DRAFT**

02 (DE Revision) Except as specifically provided in this Chapter, sidewalks and shared-use paths that are parallel and adjacent to the highway are considered to be part of a highway-rail or highway-LRT grade crossing rather than a pathway grade crossing, and are covered by the provisions of Chapters 8B and 8C rather than by the provisions of this Chapter. However, many of the treatments outlined in this Chapter are applicable to sidewalks adjacent to highway-rail or highway-LRT grade crossings, including detectable warnings, swing gates, and automatic gates.

### Delaware Revision:

- Sidewalks and shared-use paths that are adjacent to the highway are considered to be part of a highway-rail crossing (rather than a pathway grade crossing)
- Covered in Chapters 8B & 8C
- However, many of the treatments in Chapter 8D still apply



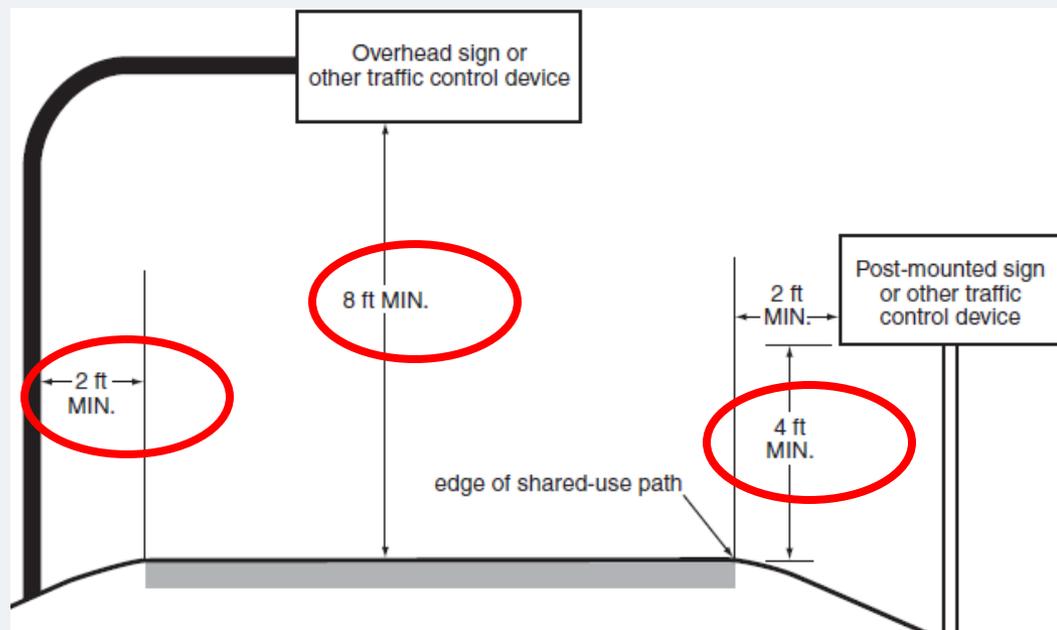
Walker Rd in Dover

# Section 8D.03 Pathway Grade Crossing Signs and Markings

## Standard:

- 01 Pathway grade crossing signs shall be standard in shape, legend, and color.
- 02 Traffic control devices mounted adjacent to pathways at a height of less than 8 feet measured vertically from the bottom edge of the device to the elevation of the near edge of the pathway surface shall have a minimum lateral offset of 2 feet from the near edge of the device to the near edge of the pathway (see Figure 9B-1).
- 03 The minimum mounting height for post-mounted signs on pathways shall be 4 feet, measured vertically from the bottom edge of the sign to the elevation of the near edge of the pathway surface (see Figure 9B-1).
- 06 When overhead traffic control devices are used on pathways, the clearance from the bottom edge of the device to the pathway surface directly under the sign or device shall be at least 8 feet.

- All signs ***shall*** be standard in shape, legend and color
- Minimum lateral clearance required = **2 feet**
- Minimum mounting height required for post mounted signs = **4 feet**
- Minimum lateral clearance required for overhead signs = **8 feet**



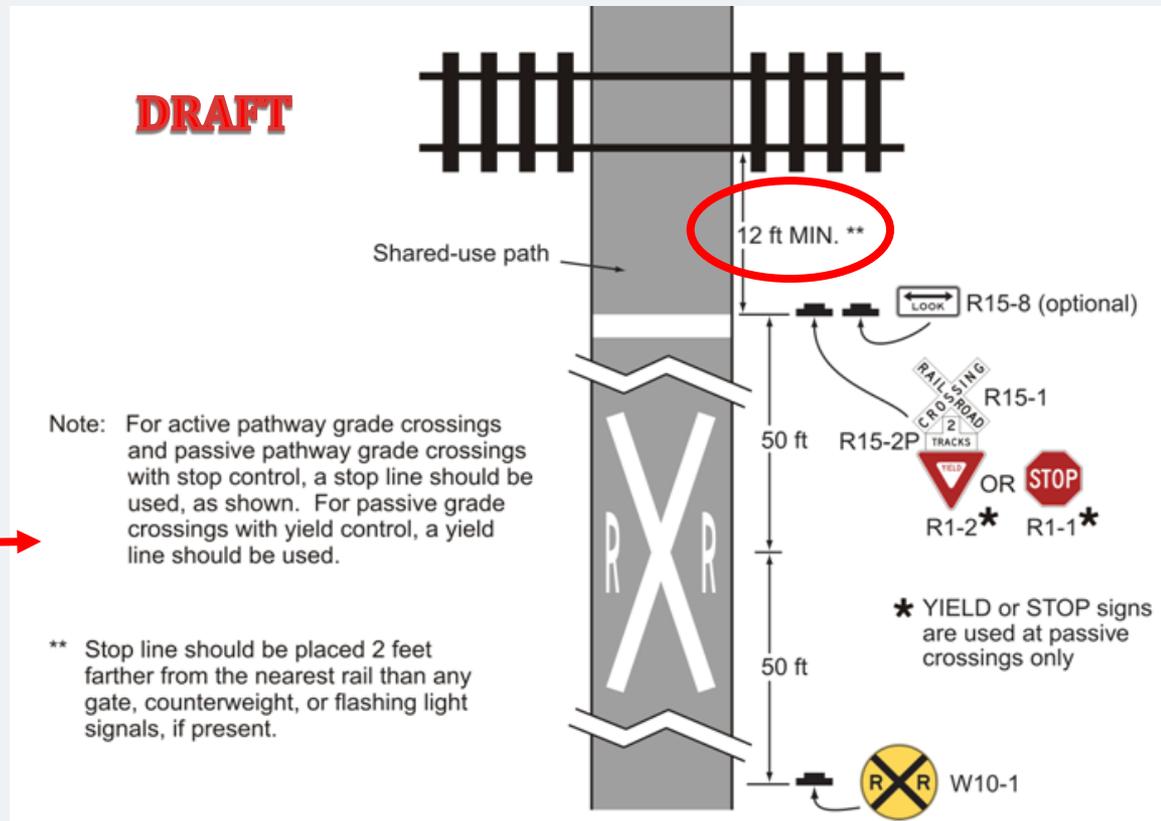
# Section 8D.03 Pathway Grade Crossing Signs and Markings

04 **Pathway grade crossing traffic control devices shall be located a minimum of 12 feet from the center of the nearest track.**

*Guidance:*

07 *If pathway users include those who travel faster than pedestrians, such as bicyclists or skaters, the use of warning signs and pavement markings in advance of the pathway grade crossing (see Figure 8D-1) should be considered.*

- **Minimum distance required from the center of the nearest track to traffic control devices = 12 feet**
- Advance warning signs as shown in Figure 8D-1



## Section 8D.03 Pathway Grade Crossing Signs and Markings

- 05 The minimum sizes of pathway grade crossing signs shall be as shown in the shared-use path column in Table 9B-1.

**Table 9B-1. Bicycle Facility Sign and Plaque Minimum Sizes (Sheet 1 of 2)**

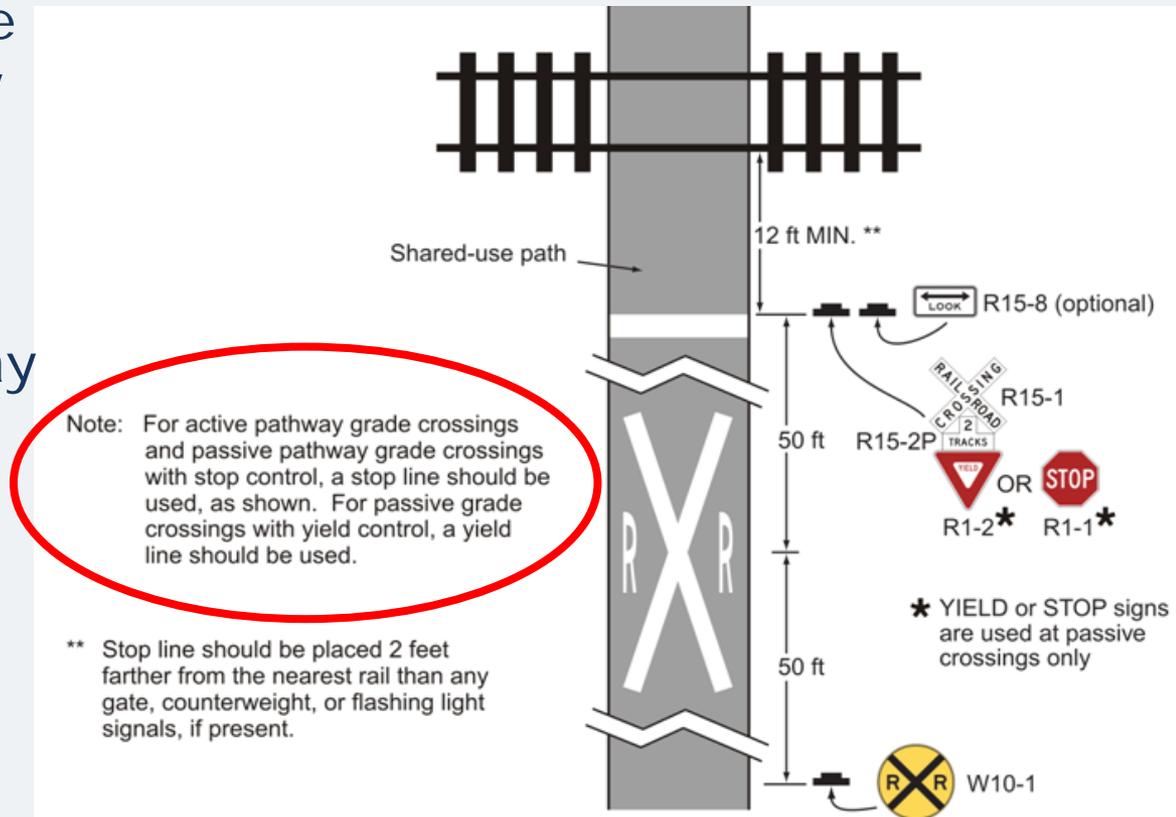
Sign or Plaque	Sign Designation	Section	Shared-Use Path	Roadway
Stop	R1-1	2B.05, 9B.03	18 x 18	30 x 30
Yield	R1-2	2B.08, 9B.03	18 x 18 x 18	30 x 30 x 30
Bike Lane	R3-17	9B.04	—	24 x 18
Bike Lane (plaques)	R3-17aP, R3-17bP	9B.04	—	24 x 8
Movement Restriction	R4-1,2,3,7,16	2B.28,29,30,32; 9B.14	12 x 18	18 x 24
Begin Right Turn Lane Yield to Bikes	R4-4	9B.05	—	36 x 30
Bicycles May Use Full Lane	R4-11	9B.06	—	30 x 30
Bicycle Wrong Way	R5-1b	9B.07	12 x 18	12 x 18
Push Button to Turn On Warning Lights	R10-25	9B.11	9 x 12	9 x 12
Bike Push Button for Green Light (arrow)	R10-26	9B.11	9 x 15	9 x 15
Grade Crossing (Crossbuck)	R15-1	8B.03, 9B.14	24 x 4.5	48 x 9
Number of Tracks (plaque)	R15-2P	8B.03, 9B.14	13.5 x 9	27 x 18
Look	R15-8	8B.17, 9B.14	18 x 9	36 x 18
Turn and Curve Warning	W1-1,2,3,4,5	2C.04, 9B.15	18 x 18	24 x 24

Guidance: **DRAFT**

01A (DE Revision) For active pathway grade crossings and passive pathway grade crossings with stop control, a stop line should be used. For passive grade crossings with yield control, a yield line should be used.

## Delaware Revision:

- STOP sign = stop line  
YIELD sign = yield line  
at all passive pathway grade crossings
- Stop lines should be used all active pathway grade crossings



### Standard:

01 Except as provided in Paragraph 2, where active traffic control devices are not used, a Crossbuck Assembly shall be installed on each approach to a pathway grade crossing.

### Option:

02 The Crossbuck Assembly may be omitted at station crossings and on the approaches to a pathway grade crossing that is located within 25 feet of the traveled way at a highway-rail or highway-LRT grade crossing.

- **Crossbuck Assembly shall be installed on each approach to a pathway grade crossing except:**
  - At station crossings
  - Approach to a crossing located within 25 ft of the traveled way.

### Standard:

06 If used, swing gates shall be designed to open away from the track(s) so that pathway users can quickly push the gate open when moving away from the track(s). If used, swing gates shall be designed to automatically return to the closed position after each use.

- **Swing gates shall be designed**
  - to open away from the track(s)
  - automatically return to the closed position after each use.

## Standard:

- 01 If used at a pathway grade crossing, an active traffic control system shall include flashing-light signals for each direction of the pathway. A bell or other audible warning device shall also be provided.
- 03 If used at pathway grade crossings, alternately flashing red lights shall be aligned horizontally and the light units shall have a diameter of at least 4 inches. The minimum mounting height of the flashing red lights shall be 4 feet, measured vertically from the bottom edge of the lights to the elevation of the near edge of the pathway surface.

- If used, an active traffic control systems at pathway grade crossings shall
  - include flashing light signals for each direction of the pathway
  - be provided with a bell or other audible warning device
- Alternately flashing red lights shall
  - Be aligned horizontally
  - Shall be at least 4 inches in diameter
  - Be mounted at least 4 feet high



**Pathway Grade Crossing on  
Long Island Railroad**

### Standard:

09 **Where a sidewalk is located between the edge of a roadway and the support for a gate arm that extends across the sidewalk and into the roadway, the location, placement, and height prescribed for vehicular gates shall be used (see Section 8C.04).**

### Guidance:

10 *If a separate automatic gate is used for a sidewalk, the height of the gate arm when in the down position should be a minimum of 2.5 feet and a maximum of 4 feet above the sidewalk.*

11 *If a separate automatic gate is used for a sidewalk at a highway-rail or highway-LRT grade crossing, instead of a supplemental or auxiliary gate arm installed as a part of the same mechanism as the vehicular gate, a separate mechanism should be provided for the sidewalk gate to prevent a pedestrian from raising the vehicular gate.*

Where a sidewalk is between the roadway and gate support:

- **The location, placement and height prescribed for vehicular gates shall be used**

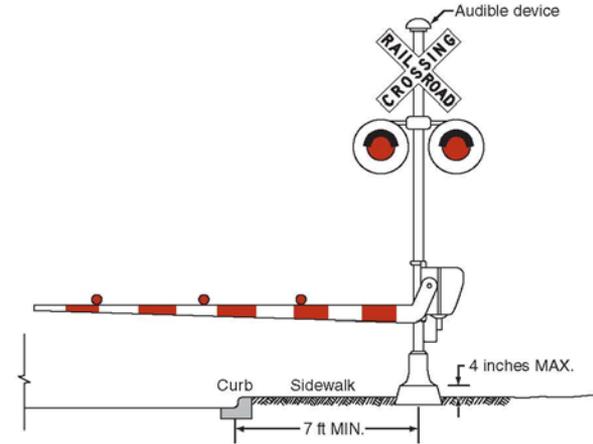
If a separate automatic gate is used for a sidewalk:

- *The height of the gate arm when in the down position should be 2.5 – 4 feet above the sidewalk*
- *A separate mechanism should be provided to prevent a pedestrian from raising the vehicular gate*



**SR 14 in Harrington**

**Figure 8C-5. Example of a Shared Pedestrian/Roadway Gate**



**Figure 8C-6. Example of a Separate Pedestrian Gate**

Note: The provision of a separate pedestrian gate is optional based upon site-specific conditions. If a separate pedestrian gate is provided, the need for a separate Crossbuck sign, audible device, and flashing-light signals should be determined based upon site-specific conditions such as the proximity of the sidewalk or shared-use path to the roadway grade crossing devices.

